

브랜드 평판이 주가에 미치는 영향: 게임 기업을 중심으로

The Effect of Brand Reputation on Stock Price: Focused on Game Firms

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요약

최근 게임기업의 가치를 평가할 때 재무제표의 재무적 요인뿐만 아니라 게임 콘텐츠에 대한 소비자 평가와 충성도와 같은 비금융적 요인의 중요성이 더욱 강조되고 있다. 본 연구에서는 게임 회사의 가치평가를 위한 비재무적 측정요소로서 브랜드 평판을 제시하고, 국내 30대 게임 회사의 자료를 이용하여 브랜드 평판이 게임 회사의 주가에 미치는 영향을 검증한다. 본 연구의 실증분석에서는 브랜드 평판 지수와 게임 회사의 주가 사이에 유의한 정(+)의 상관관계가 나타난다고 보고했다. 이러한 실증결과는 브랜드 평판이 게임기업의 주가에 직접적인 영향을 미칠 수 있다는 것을 의미한다. 본 연구는 게임 기업을 효과적으로 평가하기 위한 비재무적 요인으로서 브랜드 명성의 효과에 대한 실증적 증거를 제시함으로써 자본시장과 학계에 기여할 것으로 기대된다.

■ 중심어 : | 게임 기업 | 브랜드 평판 | 주가 | 기업가치 | 가치평가 |

Abstract

Recently, the importance of not only financial factors from financial statements but also non-financial factors such as consumers' evaluation and loyalty to game content is more emphasized when assessing the value of game companies. In this study, we suggest the brand reputation index as an appropriate measure of a game company's valuation and examine the effect of the brand reputation on game companies' stock price using the observations of Korean major 30 game companies. From the empirical results, we find that there is a significantly positive association between the brand reputation index and the game companies' stock price. This explains that the brand reputation of game companies can directly affect their firm value. The findings are expected to contribute to capital markets and academia as they have presented empirical evidence of the importance of brand reputation as a non-financial measure for the valuation of game companies.

■ keyword : | Game Companies | Brand Reputation | Stock Price | Firm Value | Valuation |

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I. Introduction

The purpose of this study is to empirically validate that the brand reputation is appropriate as a non-financial component to consider when assessing the value of game companies. Research in the traditional financial and accounting fields used financial information, such as book value (asset, liability, and equity) or profit information (sales, operating profit, and net income), primarily to assess the value of an entity[1]. However, recent news have reported that brand reputation made from positive or negative images of companies directly or indirectly affect corporate performance[2]. For example, while the firm value of Korean Air has plummeted since the false sense of prestige of Korean Air's management was reported in the news, Narugaon F&C's sales performance has continued to grow after being known as a company serving crime victims in Korea.

Recently, game companies have been emphasizing the potential value of corporate reputation over tangible assets. Because, based on the game evaluation from customers and their royalty level, corporate performance can be created by making decisions about the production of future game content and related product development. Therefore, there are limitations in assessing the firm value of the game industry as an evaluation method that use financial information only in the past. Therefore, this study introduces the brand reputation index as a non-financial measure for the valuation of game companies and examines empirically whether the brand reputation of game companies can have a great influence on their stock prices.

According to Chang et al. (2009), brand reputation means perceptual belief or perspective in people or things accumulated from the past to the present[3]. Fombrun and Shanley (1990) and Standifird et al.

(1999) explained that the brand reputation is assessed by external stakeholder rather than by internal stakeholder and that the more companies have established a high brand reputation, the higher their performance can be[4][5]. In this study, to provide empirical evidence of the hypothesis that the reported brand reputation of the previous study could have a significant impact on the company's value, we conduct empirical tests using the brand reputation index of Korean 30 major game companies provided by the Korea Reputation Center.

From the empirical results, we find that there is a significantly positive association between the brand reputation index of game companies and their stock price. These results indicates that the higher a game company's brand reputation, the higher the company's stock price while the lower the brand reputation, the lower the company's stock price. This supports that brand reputation as a non-financial factor is useful information in the valuation of game companies.

However, this study has the following research limitations. First, there is a possibility that the effect of brand reputation index on the game companies' stock prices may be overstated statically. Because it is difficult to collect the game companies' internal financial information that is consistent with the date on which the brand reputation index was disclosed from Korea Reputation Center. Therefore, we cannot include control variables for financial factors in this study.

Next, due to restrictions on data collection, this research model could not include control variables other than key variables from brand reputation index. As a result, there is a problem where the influence of the brand reputation index on the entity's share price may be generalize that the results of this study will appear the same in other periods, since this study was

the result of using the brand reputation index that was disclosed seven times in 2017. Despite these limitations, we expect the contribution of this research result are as follows.

First, the game industry is very important as a new economic growth engine, but the empirical study of the game industry was not sufficiently conducted. In particular, studies on valuation of past game companies were conducted mostly by Delphi method or expert questionnaire rather than by empirical analysis studies, which make it difficult to determine the actual impact between non-financial elements and firm value[6-8]. The findings are expected to contribute to capital markets and academia by providing empirical evidence of the association between the non-financial elements and the value of game company as asserted in the preceding study.

Second, the results of this study will be able to increase the demand of professional personnel to create, manage, and restore brand reputation in companies by emphasizing the importance of brand reputation to the corporate managers. The current game content production industry has been negligent in fostering manpower to build long-term brand reputation by focusing only on short-term sales. Whether or not the next game contents will be successful in the future game market and the forecast of future demand will depend on how well the brand reputation of the existing game contents can be built. Therefore, it is expected that this study will increase social interest and active investment in professional personnel to create, maintain, and restore positive brand recognition for game companies.

Third, this study checks that the brand reputation index of game companies is useful information for evaluating the value of game companies. Through this, it is expected that interest in data collection of future information related to brand reputation will be

increased by presenting the importance of brand reputation in the game industry.

The rest of this paper is organized as follows. Section 2 discusses the prior research and develops our hypothesis. Section 3 provides the research design. Section 4 reports the empirical results from the regression analysis. Section 5 concludes the study.

II. Prior Research and Hypothesis Development

1. The Trend of Korean Game Industry and the Valuation of Game Companies

Since the research was conducted on Korean game companies, understanding of the Korean game industry should be the first priority. In this session, we introduce related trends and research about Korean game industry. According to the Korea Creative Content Agency (2017), the online game industry grew rapidly in the 2000s, ranking fifth in the global game market with 5.7 percent of the global game market as of 2016[9][10]. This means that the Korean game industry is ahead of advanced European countries such as Germany and France. With the development of the Korean game industry, foreign investors are increasingly investing in Korean game companies and M&A, and there is growing interest in how to better evaluate the value of Korean game companies.

Prior to the 2000s, valuation studies of online companies and venture firms in Korea, including game companies, were mostly covered in terms of traditional valuation methods based on financial factors, and studies covering the value of game companies in terms of non-financial information were

insufficient. Thus, research since the 2000s required a qualitative assessment of non-financial factors as well as financial factors of an entity.

The task study in 2001 on the firm valuation of Korean online companies by the Ministry of Information and Communication in Korea stated that new online companies should consider a variety of factors other than financial information because of the high market volatility[11]. Jeon (2002) used the data from 25 listed Korean game companies to the factors related to firm value[12]. The study reported that there was no significant correlation between the size of investment expenditure, which is a financial component, and the firm value, but reported that the concentration level of game development, a non-financial component, had a significant impact on the firm value.

In 2007, the Korea Game Industry Agency explained that the valuation of game companies should consider both qualitative and quantitative elements that reflect the characteristics of the game market and the industry (Korean Game Industry Agency, 2007)[13]. In particular, the agency suggested the management's ability, human resources and development capabilities, and market conditions as the elements of firm valuation model. Kwon (2010) conducted a Delphi survey based on game evaluation data and derived a total of 20 qualitative assessment items[6]. The study presented assessment items such as corporate competitiveness, technical skills, merchantability, business feasibility, and operability. Choi et al. (2013) presented the core fun of the game, its level of immersion, security reliability, and capabilities of key developers as qualitative factors for valuating mobile game companies[8].

However, previous studies highlighting the importance of non-financial factors in assessing a game company's value were conducted mostly by

means of Delphi and expert surveys, and this approach makes it difficult to determine the actual impact between non-financial factors and firm value. In this study, we perform empirical testing the association between non-financial factor and firm value to complement these limitations.

2. Brand Reputation

American Marketing Association (2004) defines the brand is name and symbol used to distinguish goods and services from other sellers[14]. Aaker (1991) also explained that the value of assets can be generated through brands, and brands are treated as important determinants that move the market in connection with a variety of possibilities[15]. The study of brands in terms of assets was done largely from a marketing and financial perspective. Aaker, a leading researcher from a marketing perspective, divided the value of a brand's assets into brand loyalty, brand awareness, brand association, embedded pervasive quality[16]. This marketing perspective study was based on consumer opinion, so the method of analysis was mainly used through survey.

From a financial perspective, many prior studies has been done with the brand valuation model developed from Interbrand in 1988 and the brand valuation model presented in 1996 by Financial World[17]. These valuation models derive the value of brand assets by weighting income from the brand based on historical financial data. Simon and Sullivan (1993) also attempted to assess firm value from a financial perspective by linking brand assets to stock prices[18]. However, it was difficult to provide an accurate measurement method because brand assets can increase or decrease in value over time. This led to the need for research dealing with the value of brand reputation.

Fombrun and Van Riel (2004) compiled 20 brand

reputation index items, comprising six dimensions: social responsibility, emotional appeal, product and service, workplace environment, financial performance, vision and leadership[19]. Later, The Reputation Institute proposed RepTrack which is an integrated, standardized corporate reputation measurement tool after a number of calibrations[20]. In Korea, the Korea Reputation Center provides brand reputation index measured by its big data evaluation system[21].

3. Hypothesis Development

The success of game companies depends on the development of intangible assets, such as game content, and the provision of continuous updates for game users is critical, breaking away from the sale of one-time game content. If game companies offer high levels of game content and stable service, positive brand reputation will be created from consumers and eventually the value of the company will be increased. On the other hand, providing low-cost game content and unstable services will create negative brand reputations, which will result in lower corporate value.

Therefore, the brand reputation may affect consumer loyalty and future sales performance, and will ultimately affect the company's stock price. We set up the following hypothesis in this study.

Hypothesis: Game companies' brand reputation index is positively associated with their stock price.

III. Research Method

1. Brand Reputation Index and Stock Price of Korean Game Companies

In this study, we use the major 30 Korean game

companies' brand reputation index from the Korea Reputation Center and their stock price to test the association between them. The Korea Reputation Center disclosed the brand reputation index of major 30 Korean game companies seven times in 2017, on February 22, March 31, May 1, June 2, September 12, and November 13. [Table 1] is an example of the brand reputation index published on 13 November 2017. Korea Reputation Center explains that they measure the major 30 game companies' brand reputation index through the big data analysis, and used the five indices: participation index, media index, communication index, community index, and social contribution index as detailed measurements.

Table 1. Brand Reputation Index of Major 30 Korean Game Companies Disclosed on 13th November 2017

| Game Firms | Index1 | Index2 | Index3 | Index4 | Index5 |
|--------------|-----------|---------|-----------|-----------|-----------|
| NCsoft | 1,143,656 | 903,279 | 1,805,364 | 2,184,774 | 2143,878 |
| Nexon | 678,224 | 835,107 | 993,402 | 900,056 | 793,632 |
| Netmarble | 214,056 | 653,315 | 208,348 | 837,325 | 724,016 |
| Golfzon | 180,208 | 307,970 | 538,216 | 1563,711 | 891,328 |
| Com2us | 83,161 | 285,844 | 673,260 | 1127,517 | 778,739 |
| Gamevil | 86,790 | 160,563 | 545,174 | 772,682 | 1,050,829 |
| Webzen | 147,859 | 174,616 | 521,066 | 464,552 | 825,651 |
| Actozsoft | 1,143,656 | 113,620 | 342,804 | 176,081 | 309,619 |
| Sundaytoz | 44,894 | 92,989 | 380,338 | 260,883 | 1,104,778 |
| Longtukorea | 78,979 | 57,109 | 123,774 | 125,028 | 1,290,080 |
| Mgame | 81,819 | 12,259 | 198,156 | 1,059,658 | 283,818 |
| Neowiz | 153,625 | 101,361 | 822,906 | 293,499 | 262,707 |
| Ydonline | 53,336 | 22,724 | 365,246 | 371,913 | 516,032 |
| Nexon-gt | 126,319 | 33,787 | 368,284 | 122,084 | 656,768 |
| Wemade | 64,146 | 99,268 | 455,504 | 255,220 | 272,090 |
| Neptune | 92,234 | 23,621 | 295,470 | 586,997 | 138,380 |
| Patigames | 34,400 | 27,807 | 361,718 | 241,676 | 295,546 |
| NHNent. | 93,733 | 130,962 | 414,050 | 123,171 | 138,390 |
| Joymax | 13,168 | 9,867 | 348,978 | 153,341 | 272,090 |
| Joycity | 22,384 | 17,641 | 330,358 | 253,680 | 138,390 |
| Playwith | 15,906 | 23,322 | 350,154 | 140,611 | 201,722 |
| Hanbitsoft | 27,946 | 21,827 | 342,902 | 164,756 | 133,699 |
| Me2on | 86,474 | 7,774 | 24,206 | 112,299 | 424,554 |
| Dobleugames | 65,645 | 55,913 | 126,028 | 143,239 | 234,560 |
| Dragonfly | 31,560 | 6,578 | 347,458 | 157,146 | 21,110 |
| Devsisters | 20,388 | 11,063 | 316,246 | 63,692 | 89,133 |
| Barunsonena | 43,001 | 9,867 | 340,256 | 61,970 | 44,566 |
| Entermate | 18,376 | 30,498 | 33,124 | 116,149 | 154,810 |
| Action2quare | 29,027 | 8,372 | 32,830 | 119,773 | 159,501 |
| Thumbage | 20,498 | 8,073 | 19,012 | 31,574 | 7,037 |

Table 2. Explanation of the Five Indices for Measuring Brand Reputation Index of Major 30 Game Companies

| Five Indices | Measures |
|---------------------------|--|
| Participation Index | Level of positive or Negative evaluation |
| Media Index | Level of media Interest |
| Communication Index | Level of consumer involvement and communication |
| Community Index | Level of conversation in social networking service |
| Social contribution Index | Level of contribution to society |

In this study, we matched the data of the brand reputation index and closing stock price of each game company at the data disclosed date[20]. [Table 3] is a one-on-one response of Nexon, NCsoft, and Wemade's brand reputation index and their stock price on 31 March and 1 May 2017.

Korea Reputation Center reported Nexon's brand reputation index was 2,814,369 points on March 31, 2017, and was 2,528,410 points on May 1, 2017. On March 31, 2017 and May 1, 2017, Nexon closed at 8,200 Korean won and 7,930 Korean won, respectively.

Next, NCsoft's brand reputation index was 2,135,081 points on March 31, 2017, and was 1,451,228 points on May, 2017. The closing stock prices of NCsoft on March 31, 2017 and May 1, 2017 respectively were 305,000 Korean won and 360,000 Korean won.

Last, the brand reputation index of Wemade was 239,281 on March 31, 2017 points and 330,378 points on May 1, 2017. The closing stock prices of Wemade were 29,100 Korean won and 30,800 Korean won on the respective date.

In the same way, we combined the brand reputation index and the stock price in 2017 of the major 30 game companies and eventually collected total 192 observations.

Table 3. Examples of One-on-one Response of the Brand Reputation Index and Stock Price

(Unit: Points & Korean won)

| Company | | Date | |
|---------|-------------|-----------|-----------|
| | | March 31 | May 1 |
| Nexon | Index | 2,814,369 | 2,528,410 |
| | Stock Price | 8,200 | 7,930 |
| NCsoft | Index | 2,135,081 | 1,451,228 |
| | Stock Price | 305,000 | 360,000 |
| Wemade | Index | 239,281 | 330,378 |
| | Stock Price | 29,100 | 30,800 |

2. Research Setting

We set up variables to investigate the correlation between brand reputation index and stock price of game companies[22]. The description of the variables is shown in [Table 4]. The variable of *Brand_index1* is the brand reputation index released by the Korea Reputation Center, and the variable of *Stock_Price1* is the closing prices.

Table 4. Explanation of Variables

| Variables | Explanation |
|---------------------|--|
| <i>Brand_Index1</i> | Brand Reputation Index disclosed by Korea Reputation Center |
| <i>Stock_Price1</i> | Closing Stock Price at the date of Brand Reputation Index measured |
| <i>Brand_Index2</i> | <i>Natural log of Brand_Index1</i> |
| <i>Stock_Price2</i> | <i>Natural log of Stock_Price1</i> |

In [Table 5] of the following chapter, the range between minimum value and maximum value for *Brand_Index1* and *Stock_Price1* was quite wide. Specifically, the minimum and maximum value of *Brand_index1* is 23,221 points and 8,180,951 respectively, which is about 385 times different. In addition, the minimum value and maximum value of *Stock_Price1* is 1,220 Korean won and 456,000 Korean won respectively, which are about 374 times

different. The standard deviation of *Brand_Index1* and *Stock_Price2* has high value at 1,058,783 and 73,440, respectively. When performing regression analysis using the variables of the wide range differences and the high standard deviation, measurement errors may be generated and the regression results may be distorted. Therefore, to compensate for this problem, we add the variables of *Brand_Index2* and *Stock_Price2* in this study.

Brand_Index2 is the value of natural log of *Brand_Index1* and *Stock_Price2* is the value of natural log of *Stock_Price1*. Table 5 shows that the range of *Brand_Index2* and *Stock_Price2* is drastically reduced. The standard deviation of *Brand_Index2* and *Stock_Price2* is also reduced as 1.22 and 1.25 respectively. Finally, we set up the following regression model 1 and 2 in [Figure 1] using *Brand_Index1* and *Brand_Index2* as independent variables and *Stock_Price1* and *Stock_Price2* as dependent variables.

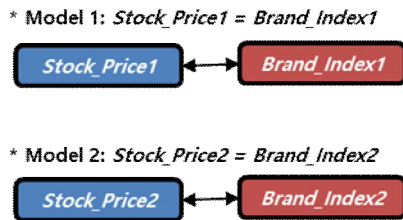


Fig. 1. Model Specification

IV. Empirical Results

1. Descriptive Statistics

[Table 5] shows descriptive statistics for the variables used in regression analysis. The minimum, median, and maximum values of *Brand_Index1* are 21,221, 273,361 and 8,180,951, respectively. The average value of Korean major 30 game companies'

brand reputation index for 2017 is 708,124 points. The minimum, median and maximum values of *Stock_Price1* are 1,220, 11,650, and 456,000 respectively, and the average stock price of the game companies during the period is 364,422 Korean won.

However, measurement errors may occur if empirical analysis is performed using these variables with a wide range between the minimum and maximum values and with high standard deviations. To reduce the measurement errors, we create the variables of *Brand_index2* and *Stock_Price2*, the values of natural log of *Brand_Index1* and *Stock_Price1*. The minimum, median, and maximum values of *Brand_index2* are 9.96, 12.52 and 15.92 respectively. The mean and standard deviation of *Brand_index2* are 12.70 and 1.22. The minimum, median, and maximum values of *Stock_Price2* are 7.11, 9.56, and 13.03 respectively. The mean and standard deviation of *Stock_Price2* is 9.56 and 1.23. You can see that the range between minimum and maximum and the standard deviation of *Brand_index2* and *Stock_Price2* are significantly reduced compared to *Brand_index1* and *Stock_Price1*. We use total 192 observations for the empirical analysis in this study.

Table 5. Descriptive Statistics

| Variables | Mean | St. Dev. | Min. | Median | Max. |
|---------------------|---------|-----------|--------|---------|-----------|
| <i>Brand_Index1</i> | 708,124 | 1,058,783 | 21,221 | 273,361 | 8,180,951 |
| <i>Stock_Price1</i> | 364,422 | 73,440 | 1,220 | 11,650 | 456,000 |
| <i>Brand_Index2</i> | 12.70 | 1.22 | 9.96 | 12.52 | 15.92 |
| <i>Stock_Price2</i> | 9.56 | 1.25 | 7.11 | 9.36 | 13.03 |

2. Results of Regression Analysis

[Table 6] provides the empirical analysis of regression model 1 ($Stock_Price1 = Brand_Index1$).

The first column indicates that the coefficient for *Brand_Index1* is 0.616 and statistically significant at the 1% level (The t value is 10.786, and the P value is less than 0.001, which is significant with a confidence level of 99%). There are positive correlation between *Brand_Index1* and *Stock_Price1*, and therefore we can understand that the higher (the lower) the brand reputation, the higher (the lower) the game company's stock price from this result.

Table 6. Empirical results#1

| Independent variable | Dependent Variable = <i>Stock_Price1</i> | | |
|----------------------|--|---------|---------|
| | std. beta | t-stat. | p-value |
| <i>Brand_Index1</i> | 0.616*** | 10.786 | 0.000 |
| Adjust R2 | 37.7% | | |
| # of observation | 192 | | |

Note: *** denotes the significant level at 1% or less.

[Table 7] provides the empirical analysis of regression model 2 (*Stock_Price2* = *Brand_Index2*). The first column indicates that the coefficient for *Brand_Index2* is 0.540 and statistically significant at the 1% level (The t value is 8.841, and the P value is less than 0.001, which is significant with a confidence level of 99%). The second empirical result shows a significantly positive correlation between *Brand_Index2* and *Stock_Price2* and this supports the result of the first empirical result.

There are positive correlation between *Brand_Index1* and *Stock_Price1*, and therefore we can understand that the higher (the lower) the brand

Table 7. Empirical results#2

| Independent variable | Dependent Variable = <i>Stock_Price2</i> | | |
|----------------------|--|---------|---------|
| | std. beta | t-stat. | p-value |
| <i>Brand_Index2</i> | 0.540*** | 8.841 | 0.000 |
| Adjust R2 | 28.8% | | |
| # of observation | 192 | | |

Note: *** denotes the significant level at 1% or less.

reputation, the higher (the lower) the game company's stock price from this result.

Overall, we confirm from the empirical analysis that brand reputation can have a significant impact on the stock price of a game company.

V. Conclusion

In this study, we examine brand reputation as a non-financial factor that can affect stock price using the observations of Korean major 30 game companies in 2017. Most studies of firm value primarily assess the firm value by using financial factors. However, for the characteristics of game companies that are highly dependent on intangible assets and consumer evaluation, unlike general manufacturing companies, there is a limit to assessing the value of them by financial factors alone.

In the gaming industry, in particular, the importance of brand reputation is emphasized more because of the high level of customer loyalty from the gaming content of companies with high brand reputation. We consider that brand reputation an important non-financial component that is required when assessing the value of game companies, and therefore we conduct empirical analysis to verify that brand name can have a significant effect on the entity's stock price in fact.

From this empirical result, we find that there is a significantly positive relationship between the brand reputation index of the game company and the company's stock price. This result means that the higher (lower) the brand reputation, the higher (lower) the company's stock price. For the robust empirical analysis, we use the modified variables added to control the measurement error related high volatility, and the robust empirical analysis also

shows support for the hypothesis of this study.

However, this study has the following research limitations. Because it is difficult to collect the game companies' internal financial information that is consistent with the date on which the brand reputation index was disclosed from Korea Reputation Center, the empirical models fail to include control variables for financial factors. As a result, there is a possibility that the effect of brand reputation index on the game companies' stock prices may be overstated statically.

In addition, the results of this study may not appear the same in other years because the study was based on the brand reputation index, which was disclosed seven times in 2017. In other words, the empirical results may not generalize that the positive association between brand reputation index and stock price will be existed in other periods because of the limited observation data.

Nevertheless, this study contributes to supplementing the methodological limitations of existing prior studies and to performing empirical analyses on the relationship between brand reputation index as non-financial factor and stock price of game companies. Specifically, we expect the contribution of our finding are as follows.

First, the game industry is very important as a new economic growth engine, but the empirical study of the game industry was not sufficiently conducted. Our finding is expected to contribute to capital markets and academia by providing empirical evidence of the association between the non-financial elements and the value of game company as asserted in the preceding study.

Second, the results of this study can help to increase the demand of professional personnel to create, manage, and restore brand reputation in companies by emphasizing the importance of brand

reputation to the corporate managers. The current game content production industry has been negligent in fostering manpower to build long-term brand reputation by focusing only on short-term sales. Whether or not the next game contents will be successful in the future game market and the forecast of future demand will depend on how well the brand reputation of the existing game contents can be built. Therefore, it is expected that our finding will increase social interest and active investment in professional personnel about to create, maintain, and restore positive brand reputation for game companies.

Third, this study suggests that the brand reputation index of game companies is useful non-financial information for evaluating the value of game companies. Through this, it is expected that interest in data collection of future information related to brand reputation will be increased by presenting the importance of brand reputation in the game industry.

Overall, this study is expected to contribute to the addition of the empirical evidence to the existing literature despite the limitations of the use of restricted data. In the future, if enough brand name index data is available, we would like to conduct a more detailed empirical analysis study, taking into account both financial and non-financial factors.

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